PATENT SPECIFICATION

759,524

Date of Application and filing Complete Specification: December 30, 1953. *No. 36161/53*

Application made in Austria on December 30, 1952

Complete Specification Published: October 17, 1956.

Index at acceptance:—**Class 7(3)**, B2J(1B6:2:4A:7:14:15).

COMPLETE SPECIFICATION

An Improved Fuel Injection Nozzle for Fuel Injection Internal Combustion Engines

I, EMMERICH SATZGER, of Austrian nationality, the personally responsible partner of the firm FRIEDMANN & MAIER, of Burgfried 17, Hallein, Austria, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement :—

This invention relates to a fuel injection nozzle arrangement for fuel injection internal combustion engines, wherein the inner end surface of the nozzle body member is partly screened with respect to the combustion space by a member over-lapping it, against which it does not abut directly. In the known constructions of this kind, the inner end surface of the nozzle body member either lies directly against the member overlapping it, or an air space is left between them which is intended to serve as heat insulation. The direct abutment of the front surface against the member overlapping it has the disadvantage that heat is transmitted to the nozzle. Neither has the interposition of an air space between the front surface of the nozzle, or of its front attachment, and the overlapping member, proved successful. It has been found that the protection against heat produced in this way is not adequate, this being due to the fact that, under the combustion pressure, the hot combustion gases penetrate into this air space, thereby transferring heat to a small extent to the nozzle, or to its front attachment. However, such heating up of the nozzle, or of its front attachment is dangerous since it causes a distortion of its parts and jamming of the nozzle needle.

The object of the invention is to overcome these drawbacks, and it essentially consists in that the nozzle comprises a nozzle body member having a flange at its outer end, the spraying orifice being formed at the inner end of said nozzle body member, and a sleeve which clamps said flange of said nozzle body member to the nozzle holder, said sleeve surrounding the nozzle body member and overlapping a part of the inner end surface of said nozzle body member to screen it from the combustion space, leaving an intermediate space between the sleeve and the nozzle body, said space being closed by an intermediate layer (for instance an annular disc) of heat-insulating material.

In this way penetration of the combustion gases into this intermediate space is avoided, and the nozzle body member is protected to a large extent against the heat action of the combustion gases. Even when the closure of this intermediate space with respect to the combustion space is not entirely gas-tight, free pulsation of the combustion gases due to the pressure fluctuations in the combustion space is avoided in this intermediate space, and the protection of the nozzle body member against heat is considerably improved. By making the annular disc of suitable thickness, it is possible to obtain a complete seal between the nozzle, or its front attachment, and the overlapping part.

The part overlapping the front surface of the nozzle body member is a sleeve preferably in the form of a screw-cap clamping the nozzle body member to the nozzle holder. The advantage is obtained that a transmission of heat from the combustion space, or from the part overlapping the inner end surface of the nozzle body member that is heated by the combustion gases, to the nozzle body member is reduced to a minimum, whereby the nozzle is protected from the heat, and the danger of any deformation of the various parts of the nozzle, or jamming of the nozzle needle is avoided.

One embodiment of the invention chosen by way of example is illustrated diagrammatically in the accompanying drawings in which :—

Figure 1 is an axial section through a

[Pri

nozzle of which the body member is clamped to the nozzle holder by means of a sleeve-like screw-cap;

Figure 2 shows on an enlarged scale the end of the nozzle facing the combustion chamber.

The nozzle body member is clamped in a manner known as *per se* to the nozzle holder 3 through the intermediary of a screw-cap 2. 4 is the nozzle needle, 5 the spring, and 6 the usual rod by means of which the force of the spring is transferred to the nozzle needle 4. The screw-cap 2 comprises a sleeve-like part 7 which surrounds the nozzle body 1 and overlaps its front end 8, leaving free the nozzle opening 10, the said sleeve-like part 7 being spaced from the nozzle body and its front end.

Between the sleeve-like part 7 of the screw-cap 2 and the front surface 8 of the nozzle body member 1 there is mounted a disc 11 of heat insulating material which, on the one hand, closes the intermediate space 9 between the nozzle body member 1 and the part 7 of the screw-cap 2 with respect to the combustion space of the engine, and on the other hand, forms a heat insulation for the front surface 8 of the nozzle body 1. The annular disc 11 is strengthened at the edge of its aperture by an insertion 12 of thin sheet metal whereby the insulating material of the annular disc 11 is protected against the direct action of the combustion gases.

As can be seen from the drawing, the clamping of the nozzle body member 1 against the nozzle holder 3 is effected by the screw-cap 2 abutting against the shoulder 13 of the nozzle body 1. The distance between the rim 14 of the screw-cap 2 and the front surface 8 of the nozzle body 1 is therefore predetermined. The annular disc 11 may be made of such thickness that the same is deformed when the screw-cap is tightened up so that it lies in a gas-tight manner between the rim 14 and the front surface 8 of the nozzle body 1. In Figure 2, the extent of the deformation is indicated by *a*, the point 14′ where the rim 14 abuts against the annular disc 11 without deformation of the latter being indicated in dash lines.

What I claim is :—

1. A fuel injection nozzle for fuel injection internal combustion engines, characterised in that the nozzle comprises a nozzle body member having a flange at its outer end, the spraying orifice being formed at the inner end of said nozzle body member, and a sleeve which clamps said flange of said nozzle body member to the nozzle holder, said sleeve surrounding the nozzle body member and overlapping a part of the inner end surface of said nozzle body member, to screen it from the combustion space, leaving an intermediate space between the sleeve and the nozzle body, said space being closed by an intermediate layer (for instance an annular disc) of heat-insulating material.

2. A fuel injection nozzle as claimed in claim 1, characterised in that the sleeve is formed by a screw cap.

3. A fuel injection nozzle as claimed in claim 1 or 2, characterised in that the annular disc is so thick that it is deformed when the sleeve is tightened.

4. A fuel injection nozzle, substantially as hereinbefore described and illustrated in the accompanying drawings.

MARKS & CLERK.

Berwick-upon-Tweed: Printed for Her Majesty's Stationery Office, by The Tweeddale Press.—1956.
Published at The Patent Office, 25, Southampton Buildings, London, W.C.2, from which copies may be obtained.

759,524 COMPLETE SPECIFICATION
1 SHEET

Fig. 1

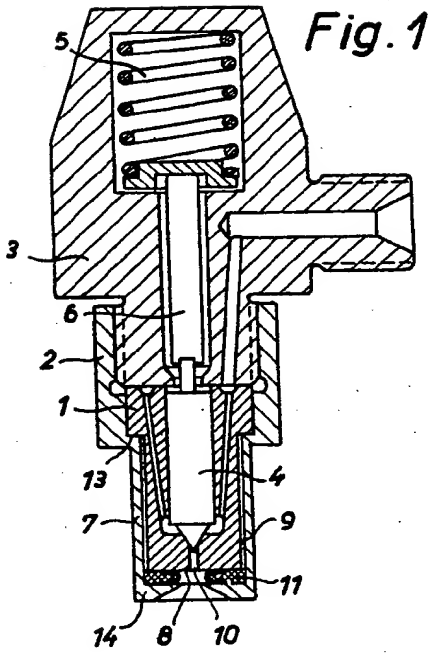

Fig. 2